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AUTHOR Hollingshead, Maybelle Clayton; Clayton, Charles
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ABSTRACT

Designed to investigate the performance of American Indian youth on the "Wechsler Intelligence Scale for Children" (WISC) compared to the "Chicago Non-Verbal" (CNV) for the purpose of establishing validity and reliability of the measurement and appraisal tools, this study analyzed test data from 71 Indian youth (aged 11 to 15) attending the Riverside Summer Institute, Anadarko, Oklahoma, in 1970. It was concluded that differences do exist among Indian youth on the 2 tests. WISC scores showed lower scale scores than the CNV except in performance. Males had a higher performance correlation on the WISC subtests than females. The performance scale of the WISC was higher for boys and girls than the CNV. The performance scale for males was 103.413 on the WISC and 95.289 on the CNV. Results indicated that the WISC is a better indicator of performance for Indian males than the CNV; however, cultural factors and tribal differences were considered as limitations. Included in addition to a description of the study and findings are a literature review; a 9-item bibliography; and tables showing mean, standard deviation, and standard error of test scores. (MJB)

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STUDY OF THE RELATIONSHIP BETWEEN THE PERFORMANCE OF INDIAN YOUTH ON THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN AND THE CHICAGO NON-VERBAL

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A Research Project

by

Maybelle Clayton Hollingshead, Ed. D.
Professor at Oklahoma College of Liberal Arts
Chickasha, Oklahoma

and

Charles Clayton
Superintendent of Schools
Wagoner, Oklahoma

Submitted to S. Gabe Paxton
Bureau of Indian Affairs
Anadarko Area Office
Anadarko, Oklahoma
July 1, 1971

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INDIAN EDUCATION

STUDY OF THE RELATIONSHIP BETWEEN THE PERFORMANCE OF INDIAN YOUTH ON THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN AND THE CHICAGO NON-VERBAL

A Research Project by

Maybelle Hollingshead, Ed. D.
Professor at Oklahoma College of Liberal Arts
Chickasha, Oklahoma

Charles Clayton
Superintendent of Schools
Wagoner, Oklahoma

INTRODUCTION

An increased emphasis has been placed on the importance of a well-planned and properly functioning testing program. The value of highly valid and reliable instruments for measuring intelligence and achievement has been a primary concern of educators, counselors, and psychologists as testing programs have been evaluated.

The selection of an appropriate instrument has a great deal of significance in the evaluation of youth. Appropriate testing instruments for use with Indian students is a pertinent problem that needs study and analysis. Since the Wechsler Intelligence Scale for Children is currently used in placing Indian students in special education classrooms, this individual intelligence test was selected for use in this study. The group test selected was the Chicago Non-Verbal. A previous study by Gabe Paxton has indicated that the Chicago Non-Verbal test gives promise as a valid tool in measuring intelligence of Indian students from bilingual and varying cultural backgrounds.

Statement of the Problem

This study was designed to investigate the performance of Indian youth on the Wechsler Intelligence Scale for Children and on the Chicago Non-Verbal.

The areas of concern are defined by the following hypotheses:

A. Do the verbal scale, performance scale, or the full scale of the Wechsler Intelligence Scale for Children significantly correlate with the intelligence achieved on the Chicago Non-Verbal for the total sample?

B. Are there significant differences in performance on the Wechsler Intelligence Scale for Children and the Chicago Non-Verbal when students are categorized by sex?

Definition of Terms

The following are definitions and clarifications of terms as they are applied throughout this study.

Wechsler Intelligence Scale for Children (1949), published by the Psychological Corporation: This test is a comprehensive individually administered battery for use with children whereby IQs are obtained by comparing each subject's test performance, not with a composite age group, but exclusively with the scores obtained by individuals in a single age group. Three IQ scores were obtained: Full Scale, Verbal Scale, and Performance Scale.

Full Scale Intelligence. Intelligence score obtained on both verbal and performance items by converting the sum of the scaled scores to an intelligence scale with a mean of 100 and a standard deviation of 15.

Verbal Scale Intelligence. Intelligence score on verbal items

obtained by translation of the Verbal Scaled Scores to an IQ scale with a mean of 100 and a standard deviation of 15.

Performance Scale Intelligence. Intelligence score on performance items obtained by the translation of the Performance Scaled Scores to an IQ scale with a mean of 100 and standard deviation of 15.

Chicago Non-Verbal, published by The Psychological Corporation. A group intelligence test designed specifically for those children who are handicapped in the use of the English language, and includes those who come from an environment where there is meager use of the English language and those who have difficulty in learning to read.

Indian Youth. This term refers to Indian young people who ranged in age from eleven years and one month to fifteen years and four months. The mean chronological age for girls was 13.4 while the mean chronological age for boys was 13.2.

Delimitations

Scope of this Study

This study was an analysis of the test scores of 104 Indian youth who ranged in age from 11-1 to 15-4 with a mean chronological age of 13.2 for boys and 13.4 for girls. The test scores were categorized according to sex. Each of the subjects had taken the Chicago Non-Verbal and the Wechsler Intelligence Scale for Children during the Riverside Summer Institute at Anadarko, Oklahoma, in 1970. The total sample of the study was 71 students on whom complete data were collected. Statistical treatment was given the raw data to obtain the means and standard

deviations. The total group data was subdivided according to sex. Pearson product moment was applied to the test data to determine if significant difference in performance existed.

Limitations of the Study.

This study was limited to the 71 Indian students attending the Riverside Summer Institute at Anadarko, Oklahoma on whom complete data were collected. Cultural factors and tribal differences of the Indian youths were also considered limitations.

Significance of the Study

The value of this study lies in the continuous search for valid and reliable tools for the measurement and appraisal of the various aspects of the Indian youth. Cultural and bilingual environments often make many tests untrustworthy.

REVIEW OF THE LITERATURE

The literature concerning intelligence tests is extensive. However, in keeping with the nature of this study and the instruments used, only those studies which were relevant were reviewed.

In reviewing the literature which dealt with the results of the Wechsler Intelligence Scale, over ninety studies were found. Thirty-five of the studies investigated compared the WISC to other tests. Of the thirty-five studies found comparing the WISC to other tests, ten compared it to either the Stanford-Binet, or to the Binet and other tests. Frandsen and Higginson (1951) reported the tests to be comparable within two sigmas on either side of the mean with a correlation of .80. Altus

(1952) compared the WISC and California Test of Mental Maturity and found a r of .81. Altus (1955) also found the verbal and non-verbal portions of the same two tests markedly comparable. Krugman's (1951) investigation reported that the Stanford-Binet IQs tend to be higher than WISC IQs. Triggs and Carter (1953) reported similar findings. Holdoway (1954) reported the Primary Mental Abilities Test to have no high degree of predictability for WISC scores.

Holland (1960), in his study involving the use of the WISC with bilingual children, reported the WISC to predict language barrier. He also suggested the possibility of using it as a direct measure of educational barrier.

Gabe Paxton (1965), is his investigation of the Chicago Non-Verbal Examination, concluded that the test was applicable for use with Indian adolescents. The test was administered to 700 Indian adolescents, ages 12 to 22, and a mean IQ of 95.01 was obtained with a standard deviation of 16.76. A significant difference was obtained between the mean IQ of the boys (97.3) and the mean IQ of the girls (92.7). To obtain predictive validity data, the Chicago Non-Verbal Examination scores of the students were correlated with corresponding scores on the California Reading Test resulting in a coefficient of correlation of .60 which was a substantial correlation.

The test manual of the Chicago Non-Verbal Examination reported a reliability of .89 by the split-half method and .80 for the test-retest method. Brown (1940) reported the results of comparisons of the Chicago Non-Verbal with other tests. The following correlations were obtained: Otis, S. A. - Intermediate raw score and Non-Verbal raw score, r = .74,

n = 153; Otis, S. A. - Intermediate intelligence quotient and Non-Verbal intelligence quotient, r = .67, n = 127, ages 8 through 15; Kuhlmann-Anderson intelligence quotient, and Non-Verbal intelligence quotient, r = .57, n = 100, Grades 4, 5, and 6; Kuhlmann-Anderson mental age and Non-Verbal mental age with chronological age constant, r = .51, n = 157; Otis, S. A. Intermediate raw score and Non-Verbal raw score and Non-Verbal raw score pantomime directions, r = .57, n = 135.

Methodology and Design

Population of the Study

The population for this study included all the summer school students at the Riverside Summer Institute, Anadarko, Oklahoma, in 1970. Out of the 104 students, complete data were collected on 71 students. The Indian youth ranged in age from eleven years one month to fifteen years four months with a mean chronological age of 13.2 for the 36 boys and 13.4 for the 35 girls.

Testing Procedures

The Chicago Non-Verbal Examination was administered to the 104 students in small groups with the instructions being given simultaneously by one person over a television hook-up in each classroom. Trained monitors were stationed in each classroom. The Wechsler Intelligence Scale for Children was administered individually to the students by four trained psychometrists.

RESULTS OF THE STUDY

The areas of concern are defined by the following hypotheses and the results of each hypotheses are stated.

Analysis Using the Total Sample

Hypothesis A. Do the verbal scale, performance scale, or the full scale of the Wechsler Intelligence Scale for Children significantly correlate with the intelligence achieved on the Chicago Non-Verbal for the total sample? The hypotheses to be tested in this area are stated in the null form as:

1. The verbal scale will not significantly correlate with intelligence achieved on the Chicago Non-Verbal for the total sample.

This hypothesis was rejected ($r = .39048$ with p .05).

In order to test hypothesis A.1, scores were obtained on all 71 subjects from the verbal subtest and correlated with scores on the Chicago Non-Verbal. The verbal subtest scores were used as the independent variable, and the Chicago Non-Verbal scores were the dependent variable. The correlational technique employed was the Pearson Product Moment technique (Guilford, p. 91-112).

TABLE I

MEAN, STANDARD DEVIATION, AND STANDARD ERROR ON THE WISC VERBAL SCALE AND CHICAGO NON-VERBAL USING THE TOTAL SAMPLE

	Mean	Standard Deviation	Standard Error
WISC Verbal Scale	87.081	11.816	1.2318
Chicago Non-Verbal	98,366	15.070	1.7518

2. The performance scale will not significantly correlate with intelligence achieved on the Chicago Non-Verbal for the total sample.

This hypothesis was rejected (r= .456 with p .05).

In order to test hypothesis A.2, scores were obtained on all 71 subjects from the WISC performance subtest and correlated with scores on the Chicago Non-Verbal. The performance subtest scores were used as the independent variable, and the Chicago Non-Verbal scores were the dependent variable. The correlational technique employed was the Pearson Product Moment.

TABLE II

MEAN, STANDARD DEVIATION, AND STANDARD ERROR ON THE WISC PERFORMANCE SCALE AND CHICAGO NON-VERBAL USING THE TOTAL SAMPLE

	Mean	Standard Deviation	Standard Error
WISC Performance Scale	99.554	14.637	1.5260
Chicago Non-Verbal	98.366	15.070	1.7518

3. The WISC Full Scale will not significantly correlate with intelligence achieved on the Chicago Non-Verbal for the total sample.

This hypothesis was rejected (r = .49063 with p .05).

In order to test hypothesis A.3, scores were obtained on all 71 subjects from the WISC verbal and performance scales and correlated with scores on the Chicago Non-Verbal. The full scale scores were used as the independent variable, and the Chicago Non-Verbal scores were the dependent variable. The correlational technique employed was the Pearson Product Moment. (See Table III).

TABLE III

MEAN, STANDARD DEVIATION, AND STANDARD ERROR ON THE WISC FULL SCALE AND CHICAGO NON-VERBAL USING THE TOTAL SAMPLE

	Mean	Standard Deviation	Standard Error
WISC Full Scale	92.134	13.710	1.4293
Chicago Non-Verbal	98.366	15.070	1.7518

Analysis by Sex

Hypothesis B

Are there significant differences in performance on the Wechsler Intelligence Scale for Children and the Chicago Non-Verbal when students are categorized by sex? The hypotheses to be tested in this area are stated in the null form as:

1. There is no significant difference in performance on the WISC Full Scale when students are categorized by-sex.

   This hypothesis was rejected ($r = .58992$ for males with p .05; $r = .40043$ for females with p .05)

In order to test hypothesis B.1, students were categorized by sex into two groups. These results were 36 males and 35 females. The Full Scale scores of the 36 males were correlated with scores on the Chicago Non-Verbal and the Full Scale scores of the 35 females were correlated with scores on the Chicago Non-Verbal. The full scale scores were used as the independent variables, and the Chicago Non-Verbal scores were the dependent variables.

TABLE IV

MEAN, STANDARD DEVIATION, AND STANDARD ERROR BY SEX ON THE WISC FULL SCALE AND CHICAGO NON-VERBAL

	Mean	Standard Deviation	Standard Error
MALES			
WISC Full Scale	91.239	12.345	1.8402
Chicago Non-Verbal	95.289	15.283	2.5108
FEMALES			
WISC Full Scale	93.011	14.872	2.1927
Chicago Non-Verbal	101.527	14.966	2.4943

2. There is no significant difference in performance on the WISC Verbal Scale when students are categorized by sex.

This hypothesis was rejected with p .05.

The Verbal Scale scores of the 36 males were correlated with scores on the Chicago Non-Verbal and r = .38089, while r = .35411 when the Verbal Scale scores of the 35 females were correlated with scores on the Chicago Non-Verbal.

TABLE V

MEAN, STANDARD DEVIATION, AND STANDARD ERROR BY SEX ON THE WISC VERBAL SCALE AND THE CHICAGO NON-VERBAL

	Mean	Standard Deviation	Standard Error
MALES			
WISC Verbal Scale	84.717	11.885	1.7717
Chicago Non-Verbal	95.289	15.283	2.5108
FEMALES			
WISC Verbal Scale	89.393	13.507	1.9915
Chicago Non-Verbal	101.527	14.966	2.4943

3. There is no significant difference in performance on the WISC Performance Scale when students are categorized by sex.

This hypothesis was rejected with p .05.

The Performance Scale Scores of the 35 females were correlated with scores on the Chicago Non-Verbal and r = .36452 while r = .60588 when the Performance Scale scores of the 36 males were correlated with scores on the Chicago Non-Verbal. (See Table VI)

TABLE VI

MEAN, STANDARD DEVIATION, AND STANDARD ERROR BY SEX ON THE WISC PERFORMANCE SCALE AND THE CHICAGO NON-VERBAL

	Mean	Standard Deviation	Standard Error
MALES			
WISC Performance Scale	103.413	10.881	1.622
Chicago Non-Verbal	95.289	15.283	2.5108
FEMALES			
WISC Performance Scale	97.904	11.641	1.7163
Chicago Non-Verbal	101.527	14.966	2.4943

SUMMARY AND CONCLUSIONS

General Summary of the Investigation

This investigation examined the Wechsler Intelligence Scale for Children and its subtests, as well as possible differences attributable to the factors of sex, with the Chicago Non-Verbal as a criterion variable.

The students (104 Indian youth who ranged in age from 11-1 to 15-4) were administered the Wechsler Intelligence Scale for Children and the Chicago Non-Verbal during the Riverside Summer Institute at Anadarko, Oklahoma, in 1970. The data from these groups in various combinations were examined through mean, standard deviation, standard error, and the Pearson Product Moment.

Summary of Results

The results of the study, which sought to identify differences in performance on the verbal scale, performance scale, and the full scale of the Wechsler Intelligence Scale for Children with the Chicago Non-Verbal, indicate that differences do exist.

The students' scores on the Wechsler Intelligence Scale and the Chicago Non-Verbal were below the average. The means of the Wechsler Intelligence were 87.081 verbal scale, 99.544 performance scale, and 92.134 full scale. The mean of the Chicago Non-Verbal was 98.366. The verbal scale and full scale were below the mean of the Chicago Non-Verbal, whereas the mean of the performance scale was higher than the

mean of the Chicago Non-Verbal.

The obtained correlations indicate that a higher correlation r = .49063 exists between the full scale and the Chicago Non-Verbal than between either the verbal scale or performance scale. The lowest correlation r = .39048 exists between the verbal scale and the Chicago Non-Verbal. All correlations were low, indicating significant differences between the two tests.

The students' scores for the Wechsler Intelligence Scale for Children and the Chicago Non-Verbal were categorized by sex and statistically treated to determine if there was a significant difference in performance according to the sex of the students. A higher correlation was obtained for the males than for the females for the verbal, performance, and full scale, indicating a significant difference on performance on this test according to sex. The greatest difference was on the performance scale where the correlation for the males was .60588 and the correlation for the females was .36452. The least difference in correlation was between the males and females on the verbal scale with .38089 for the males and .35411 for the females.

The mean scores of the females were higher on the verbal scale and full scale of the Wechsler Intelligence Scale and on the Chicago Non-Verbal than the males. The greatest difference in means was between the males and females on the performance scale, with 103.413 for the males and 97.904 for the females. The females obtained a mean above the average mean on the Chicago Non-Verbal. The means obtained indicate that a significant difference in performance on the tests according to sex existed.

Concluding Statements

It can be concluded from the results of the study that differences do exist among Indian youth on the Wechsler Intelligence Scale for Children and the Chicago Non-Verbal. The WISC scores indicate lower scale scores than the Chicago Non-Verbal except in performance. The males had a higher performance correlation on the WISC subtests than the females. The performance scale of the WISC was higher for boys and girls than the Chicago Non-Verbal. The performance scale mean was 103.413 for males and 95.289 for males on the Chicago Non-Verbal. The results indicate that the Wechsler Intelligence Scale is a better indicator of performance for Indian males than the Chicago Non-Verbal.

The results of this study are offered as an attempt to aid in the understanding of instruments being used to test Indian youth. It is hoped that the results of this study will serve a useful purpose by benefiting those interested in Indian youth achievement.

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APPENDIX A--EXHIBIT 1

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 93 INDIAN YOUTH ON THE FULL SCALE OF THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

IQ Interval	Total Freq.	d	fd	fd^2
130-139	1	+5	+5	25
120-129	0	+4	0	0
110-119	8	+3	+24	72
100-109	18	+2	+36	72
90-99	26	+1	+26	26
80-89	27	0	0	0
70-79	6	-1	-6	6
60-69	7	-2	-14	28
	N=93		Sum fd = +71	Sum fd^2 = 229

Mean: 92.134
Standard Deviation: 13.710
Standard Error: 1.4293

APPENDIX A--EXHIBIT 2

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 93 INDIAN YOUTH ON THE PERFORMANCE SCALE OF THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

IQ Interval	Total Freq.	d	fd	fd^2
130-139	2	+4	+8	32
120-129	2	+3	+6	18
110-119	19	+2	+38	76
100-109	28	+1	+28	28
90-99	23	0	0	0
80-89	9	-1	-9	9
70-79	6	-2	-12	24
60-69	4	-3	-12	36
	N=93		Sum fd = +47	Sum fd^2 = 223

Mean: 99.554
Standard Deviation: 14.637
Standard Error: 1.5260

APPENDIX A--EXHIBIT 3

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 93 INDIAN YOUTH ON THE VERBAL SCALE OF THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

IQ Interval	Total Freq.	d	fd	fd^2
120-129	1	+4	+4	16
110-119	6	+3	+18	54
100-109	6	+2	+12	24
90-99	24	+1	+24	24
80-89	26	0	0	0
70-79	26	-1	-26	26
60-69	4	-2	-8	16
	N=93		Sum fd = +24	Sum fd^2 = 136

Mean: 87.081
Standard Deviation: 11.816
Standard Error: 1.2318

APPENDIX A--EXHIBIT 4

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 46INDIAN BOYS ON THE FULL SCALE OF THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

IQ Interval	Total Freq.	d	fd	fd^2
130-139	1	+5	+5	25
120-129	0	+4	0	0
110-119	1	+3	+3	9
100-109	7	+2	+14	28
90-99	16	+1	+16	16
80-89	17	0	0	0
70-79	1	-1	-1	1
60-69	3	-2	-6	12
	N=46		Sum fd = +31	Sum fd^2 = 91

Mean: 91.239
Standard Deviation: 12.345
Standard Error: 1.8402

APPENDIX A--EXHIBIT 5

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 47 INDIAN GIRLS ON THE FULL SCALE OF THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

IQ Interval	Total Freq.	d	fd	fd^2
110-119	7	+3	+21	63
100-109	11	+2	+22	44
90-99	10	+1	+10	10
80-89	10	0	0	0
70-79	5	-1	-5	5
60-69	4	-2	-8	16
	N=47		Sum fd = +40	Sum fd^2 = 138

Mean: 93.011
Standard Deviation: 14.872
Standard Error: 2.1927

APPENDIX A--EXHIBIT 6

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 46 INDIAN BOYS ON THE VERBAL SCALE OF THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

IQ Interval	Total Freq.	d	fd	fd^2
120-129	1	+4	+4	16
110-119	1	+3	+3	9
100-109	1	+2	+2	6
90-99	11	+1	+11	11
80-89	15	0	0	0
70-79	15	-1	-15	15
60-69	2	-2	-4	8
	N=46		Sum fd = +1	Sum fd^2 = 65

Mean: 84.717
Standard Deviation: 11.885
Standard Error: 1.7717

APPENDIX A--EXHIBIT 7

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 47 INDIAN GIRLS ON THE VERBAL SCALE OF THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

IQ Interval	Total Freq.	d	fd	fd^2
110-119	5	+3	+15	45
100-109	5	+2	+10	20
90-99	13	+1	+13	13
80-89	11	0	0	0
70-79	11	-1	-11	11
60-69	2	-2	-4	8
	N=47		Sum fd = +23	Sum fd^2 = 97

Mean: 89.393
Standard Deviation: 13.507
Standard Error: 1.9915

APPENDIX A--EXHIBIT 8

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 46 INDIAN BOYS ON THE PERFORMANCE SCALE OF THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

IQ Interval	Total Freq.	d	fd	fd^2
130-139	1	+4	+4	16
120-129	1	+3	+3	9
110-119	7	+2	+14	28
100-109	19	+1	+19	19
90-99	13	0	0	0
80-89	2	-1	-2	2
70-79	2	-2	-4	8
60-69	1	-3	-3	9
	N=46		Sum fd = +41	Sum fd^2 = 91

Mean: 103.413
Standard Deviation: 10.881
Standard Error: 1.622

APPENDIX A--EXHIBIT 9

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 47 INDIAN GIRLS ON THE PERFORMANCE SCALE OF THE WECHSLER INTELLIGENCE SCALE FOR CHILDREN

IQ Interval	Total Freq.	d	fd	fd^2
130-139	1	+4	+4	16
120-129	1	+3	+3	9
110-119	12	+2	+24	48
100-109	9	+1	+9	9
90-99	10	0	0	0
80-89	7	-1	-7	7
70-79	4	-2	-8	16
60-69	3	-3	-9	27
	N=47		Sum fd = +16	Sum fd^2 = 132

Mean: 97.904
Standard Deviation: 11.641
Standard Error: 1.7163

APPENDIX B--EXHIBIT 1

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 75 INDIAN YOUTH ON THE CHICAGO NON-VERBAL

IQ Interval	Total Freq.	d	fd	fd^2
130-139	2	+4	+8	32
120-129	4	+3	+12	36
110-119	10	+2	+20	40
100-109	17	+1	+17	17
90-99	23	0	0	0
80-89	12	-1	-12	12
70-79	5	-2	-10	20
60-69	2	-3	-6	18
	N=75		Sum fd = +29	Sum fd^2 = 175

Mean: 98.366
Standard Deviation: 15.070
Standard Error: 1.7518

APPENDIX B--EXHIBIT 2

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 38 INDIAN BOYS ON THE CHICAGO NON-VERBAL

IQ Interval	Total Freq.	d	fd	fd^2
130-139	1	+4	+4	16
120-129	1	+3	+3	9
110-119	4	+2	+8	16
100-109	9	+1	+9	9
90-99	9	0	0	0
80-89	9	-1	-9	9
70-79	3	-2	-6	12
60-69	2	-3	-6	18
	N=38		Sum fd = +3	Sum fd^2 = 89

Mean: 95.289
Standard Deviation: 15.283
Standard Error: 2.5108

APPENDIX B--EXHIBIT 3

DISTRIBUTION SHOWING THE MEAN, STANDARD DEVIATION, AND STANDARD ERROR FOR A GROUP OF 37 INDIAN GIRLS ON THE CHICAGO NON-VERBAL

IQ Interval	Total Freq.	d	fd	fd^2
130-139	1	+4	+4	16
120-129	3	+3	+9	27
110-119	6	+2	+12	24
100-109	8	+1	+8	8
90-99	14	0	0	0
80-89	3	-1	-3	3
70-79	2	-2	-4	8
	N=37		Sum fd = +26	Sum fd^2 = 86

Mean: 101.527
Standard Deviation: 14.966
Standard Error: 2.4943